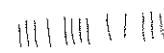


Topic 6B: Wave Vocabulary, Phases and Classification

Skill 50: Mechanical Waves including Sound

Mechanical Waves require a medium (ie they CANNOT travel through a vacuum)
(Ex: Water waves, Earthquakes, Sound waves, Slinky's)

Mechanical Waves can be either Transverse  or Longitudinal 
(Other particle vibration such as torsional or circular exist but are not part of this course)
Amplitude is related to energy

Sound Waves are Mechanical & longitudinal (Need a medium & particles vibrate parallel with energy)

Properties of Sound

- Frequency is related to pitch
- amplitude is related to energy (can be lost over time)
- Speed is related to medium
 - In air at STP sound travels at 331 m/s (on 1st page of PRT)
 - Speed in air increases with temperature due to KE of gas
 - Speed of sound in liquids or solids increases with density
Speed in water greater than air. Speed in steel greater than water

Frequency can only change at the source. (Frequency does not change if medium changes)

Skill 51: EM Waves including visible light

Electromagnetic (EM) waves are created by the acceleration (oscillation) of a charged particle (charged particles have electric fields, when in motion)
they have magnetic fields

All EM waves are Transverse 

The Energy of EM waves is related to frequency (for 2 waves of same frequency compare amplitude)

Frequency of EM waves determines classification: Radio, Infrared, Visible

In a VACUUM (empty space) all EM WAVES Ultraviolet, X-Ray, Gamma

have the same speed " c " = 3.0×10^8 m/s

$v = f\lambda$ becomes $c = f\lambda$ solve for frequency and use spectrum on PRT to determine category

In a material, speed is related to index of refraction " n "

$n = \frac{c}{v}$ or $v = \frac{c}{n}$ " v " is inverse to " n ". Air has an " n " of 1 so speed is still 3.0×10^8 m/s

Note on EM SPECTRUM: Make sure all values are in proper scientific notation

Remember f and λ are inverse so " λ " increases to right & " f " to left